Docket No. 77250P001
Express Mail No. EL802873175US

UNITED STATES PATENT APPLICATION

FOR

PICKUP PAUSE FUNCTIONALITY FOR A WIRELESS COMMUNICATION UNIT

Inventors:

DEREK L. DAVIS
WILLIAM W. SCHAAL

Prepared by:

Blakely, Sokoloff, Taylor & Zafman LLP
12400 Wilshire Blvd., Suite 700
Los Angeles, California 90025
(714) 557-3800

PICKUP PAUSE FUNCTIONALITY FOR A WIRELESS COMMUNICATION UNIT

This application claims benefit of U.S. Provisional Patent Application No. 60/240,612, filed on October 30, 2000.

FIELD

The present invention relates to the field of wireless communications. In particular, various embodiments of the invention relate to a wireless communication unit and method for receiving and temporarily deferring the establishment of a wireless connection.

BACKGROUND

Wireless communications have dramatically improved business productivity and personal safety. In particular, cellular telephones now enable business employees to stay in contact with other employees, suppliers and even customers, especially in locations where normal plain old telephone system (POTS) communications are inconvenient. Also, they enable persons in distress to communicate with law enforcement and emergency technicians.

Unfortunately, as with many emerging technologies, cellular telephones may present a variety of disadvantages. For example, cellular telephones can be disruptive to public or private gatherings such as business meetings or presentations, concerts, theater plays or other events at public venues. For these and other similar situations, in the past, cellular telephone users have been asked, or feel obligated, to temporarily deactivate their telephones. This requires the user to later remember to reactivate the cellular telephone.

Upon realizing this disadvantage, certain manufacturers now offer cellular telephones with a "silent" ring mode, which initiates a pager-like vibration to notify the cellular telephone user of an incoming call. Nevertheless, the user may still need or desire to answer the phone to confirm that the incoming call is not an emergency. In other words, while placing the cellular telephone in a silent ring mode can avoid the presence of a distracting, audible ring, it does not prevent the inevitable disruption created when the user answers the cellular telephone to receive the incoming call. This disruption can be a

sudden flurry of activity by the user to retrieve his or her cellular telephone and/or audible statements by the user despite his or her attempts to suppress or conceal the conversation.

Another disadvantage involves the use of cellular telephones while driving. Simply stated, the driver may not fully appreciate the surrounding traffic and road conditions when dialing a cellular telephone or talking on the cellular telephone. The additional activity impairs his or her ability to drive safely, which can lead to an automobile accident that injures the user or others. Furthermore, if the cell phone user was engaged on behalf of a company at the time of the call and accident, either calling during work hours or calling to conduct company business, liability may be passed through to the company.

BRIEF DESCRIPTION OF THE DRAWINGS

The features and advantages of the present invention will become apparent from the following detailed description of the present invention in which:

Figure 1 is an illustrative embodiment of a wireless system.

Figure 2 is an illustrative embodiment of exterior elements of a wireless communication unit employed within the wireless system of Figure 1.

Figure 3 is an illustrative embodiment of internal logic of the wireless communication unit of Figure 2.

Figure 4 is a first illustrative flowchart of the pickup pause feature performed by the wireless communication unit of Figures 2 and 3.

Figure 5 is a second illustrative flowchart of the pickup pause feature performed by the wireless communication unit of Figures 2 and 3.

Figure 6 is an illustrative flowchart describing a first enhancement of the pickup pause feature performed by the wireless communication unit of Figures 2 and 3.

Figure 7 is an illustrative flowchart describing a second enhancement of the pickup pause feature performed by the wireless communication unit of Figures 2 and 3.

Figure 8 is an illustrative flowchart describing a third enhancement of the pickup pause feature performed by the wireless communication unit of Figures 2 and 3.

DETAILED DESCRIPTION

In general, embodiments of the invention relate to a wireless communication unit and method for receiving and temporarily deferring the establishment of a wireless connection, such as answering an incoming cellular telephone call for example, with a minimal amount of disruption and a greater degree of safety.

Herein, certain terminology is used to discuss features of the present invention. For example, the term "user" or "recipient" is intended to refer to the operator of the wireless communication unit. The term "wireless communication unit" is intended to refer to any device that can assist in establishing a wireless connection with another device. One embodiment of a wireless communication unit includes a cellular telephone, although other types of hardware devices may apply. As described below, the "wireless connection" may be the establishment of a communication channel that enables information transmitted from a caller at a remote source to be perceived by the user of the wireless communication unit and vice versa. For instance, the information may include audio in accordance with a given format (e.g., digital or analog) and at given frequency range such as cellular, Personal Communication Systems (PCS), microwave, or satellite.

I. System Architecture

Referring to Figure 1, an illustrative embodiment of a wireless system 100 is shown. In this embodiment, the wireless system 100 comprises a plurality (N) of wireless communication units 110_1-110_N (where "N" $\geq$1). These wireless communication units 110_1-110_N may communicate directly with each other or indirectly through a wireless service provider 120 through multiple communication (e.g., audio) channels 130 and 140 as shown. It is contemplated, however, that one or more of the wireless units 110_1-110_N may communicate with a unit supporting both wired and wireless communications (e.g., a unit coupled to a wired bus such as a WLAN station) or with s wired or wireless unit via the service provider 120. Examples of a wireless service provider 120 include any base station or tower of a commercial cellular telephone company, satellites such as those employed by the former Iridium system, or even a base station serving one or more wireless communication units within a residence.

II. Wireless Communication Unit Architecture

Referring now to Figure 2, an illustrative embodiment of exterior elements of the wireless communication unit 110_1 is shown. The wireless communication unit 110_1 comprises a handset casing 200 made of a semi-rigid material such as hardened plastic. The handset casing 200 features both a front face 205 and a back face 210. The back face 210 includes power connectors (not shown) protruding therefrom. The power connectors establish an electrical coupling with a battery 215. In this embodiment, the battery 215 is removable. The front face 205 includes a set of apertures 220, a display 230, a keypad 240, a power button 250, an antenna 260 and an optional dedicated PAUSE button 290 as represented by dashed lines.

The set of apertures 220 is in close proximity to a speaker encased by the handset casing 200. These apertures 220 enable the user to more clearly hear audible sounds such as dial tones, ringer tones, or audio associated with incoming wireless signals. For instance, the set of apertures 220 is placed near at a top end 206 of the front face 205 as shown.

As further shown in Figure 2, the display 230 is a liquid crystal display that provides a visual interface for a user to program the wireless communication unit 110_1 through depression of various buttons associated with the keypad 240. The keypad 240 includes a standard set of telephone number (0-9), "#" and "*" buttons 270-281. Optional keypad buttons include a forward-scroll button 282, a backward-scroll button 283, a TALK button 284, a CLEAR button 285 or any combination thereof.

As shown, the dedicated PAUSE button 290 may be placed on a front face 205 of the handset casing 200 along with the apertures 220, display 230 and keypad 240. Depression of the PAUSE button 290 may initiate a "pickup pause" communication feature as described below. Alternatively, the PAUSE button 290 may be placed along a side of the handset casing 200. It is contemplated that the PAUSE button 290 may be eliminated if depression of a particular keypad button (e.g., "#" or "*" buttons 279 or 281) enables the "pickup pause" feature or if the "pickup pause" feature is automatically enabled through programming. The user can program the wireless communication unit 110_1 by selecting an options menu identifying control features for the wireless communication unit 110_1, activating a "pickup pause" feature, and setting an estimated

pickup time delay if this delay is adjustable.

Referring to Figure 3, an illustrative embodiment of internal logic of the wireless communication unit 110_1 is shown. The wireless communication unit 110_1 comprises a transceiver 300, a digital-to-analog converter (DAC) 310, an analog-to-digital converter (ADC) 320, a processing unit 330, an internal memory 340, speaker 350 and a microphone 360. The wireless communication unit 110_1 further includes a vibration device (e.g., transducer 370) if it supports a "silent-ring" (or vibration) feature and/or a timer 380 to control activation and/or deactivation of the "pickup pause" feature based on user programming.

As shown, the transceiver 300 is coupled to the antenna 260 in order to receive wireless signals and transfer these wireless signals to the processing unit 330. The processing unit 330, under control of a program loaded within the internal memory 340 (e.g., non-volatile memory), may perform one of a plurality of operations.

In general, one operation, performed on receipt of an incoming call, involves an initial determination whether the pickup pause feature has been enabled. If so, an automated message is transmitted from the wireless communication unit 110_1 back to the caller to indicate that the user cannot immediately answer the incoming call. Concurrently, the processing unit 330 generates a perceivable warning to the user that such incoming call has been received. In one embodiment, this warning may be accomplished through activation of the transducer 370, which causes the wireless communication unit 110_1 to vibrate. Another alternative or a complementary type of warning includes an alphanumeric message. Yet another alternative or complementary type of warning includes audible, programmable ringer tones for a sensitive environment, where the ringer tones are of a short duration (e.g., less than one second). This tone may be a singular or periodic in nature. Any one or more of these warnings allows the user to gracefully extricate himself or herself from a sensitive environment (e.g., private or public gathering where answering an incoming call would cause unwanted disruption) without having to immediately answer the cellular telephone call or rush out of the sensitive environment for fear that the caller will hang-up.

Another operation involves the processing unit 330 generating the perceivable warning of an incoming call as described above. A recorded message (e.g., pre-recorded)

is activated and communicated back to the caller in response to the user depressing a particular button of the wireless communication unit 110_1 if desired. The particular button may be the PAUSE button or even the "#" or "*" button instead of the TALK button.

III. Pickup Pause Feature

Referring to Figure 4, a first illustrative flowchart of the pickup pause feature is shown. When the pickup pause feature is enabled and placed in an Automatic mode, the incoming call is automatically answered with a message (e.g., a recorded message) that indicates to the caller that the recipient is currently in a "sensitive" environment and cannot immediately answer the call (blocks 400 and 410). The answering of the incoming call and playback of the recorded message occurs prior to or coincident with providing a perceivable warning of an incoming call to the recipient. As an option, the recorded message may indicate the "estimated" pickup time delay before the user will answer the call (block 420). This estimated time delay may be pre-programmed by the user or entered on the fly (see Figure 8). For this embodiment, the recorded message is only audible to the caller and, therefore, does not disturb those in the vicinity of the user's wireless communication unit. Furthermore, audio capture by the user's wireless communication unit is not propagated to the caller's unit, thus preventing inadvertent eavesdropping on conversations occurring in the sensitive environment.

After answering of the incoming call and playback of the recorded message, a sufficiently perceivable warning is produced to alert the user to the incoming call (block 430). It is contemplated that the perceivable warning may be a Ring signal or another type of signal provided by the service provider. Once the user has moved to a non-sensitive environment, he or she completes the wireless connection by pressing the particular button such as the PAUSE button or the "#" button for example (block 440). This suspends the recorded message (if still in operation) and connects the communication channel (blocks 450 and 460).

As an alternative to or complementary with a recorded message, it is contemplated that an alphanumeric message may be sent to the caller to indicate that the intended recipient requires time before he or she can answer the incoming call.

Referring now to Figure 5, a second illustrative flowchart of the pickup pause feature is shown. The pickup pause feature for the wireless communication unit is enabled and placed in a Manual mode. Upon receiving an incoming call, the wireless communication unit produces a perceivable warning to alert the user to the incoming call (block 500). In response to perceiving the warning, the user may explicitly activate or trigger the recorded message for the incoming call as desired (block 510). One activation technique is for the call recipient to select a particular button (e.g., a dedicated PAUSE button or simultaneous or sequential activation of one or more traditional buttons such as the "#" or "*" buttons).

If the recorded message is activated, the incoming call is answered with a recorded message that indicates to the caller that the recipient is currently in a sensitive environment and will require a brief time delay before the call can be answered (block 520). As an option, the recorded message may indicate an estimation of the time delay before the user will answer the call as described above (block 530). Similarly, the recorded message is solely audible to the caller and no other audio at the user's wireless communication unit environment is propagated to the caller's unit.

Once the user has moved to a non-sensitive environment, he or she completes the wireless connection by pressing the particular button or even a different button (block 540). This suspends the recorded message (if still in operation) and connects the communication channel (blocks 550 and 560).

With respect to the pickup pause feature of Figures 4 and 5, this functionality may be implemented entirely within the communication unit (e.g., handset) itself with no change to the existing service provider's infrastructure. The recorded message would reside in internal memory and the pickup pause feature would be directly controlled by the processing unit based on selections by the call recipient (user).

However, it is contemplated that the pickup pause feature may be offered as an optional service by a service provider (e.g. cell phone service company), with potentially no modification to the wireless communication unit itself. In one embodiment, a special call to the service provider could enable the pickup pause feature. Other pickup pause enablement techniques may be accomplished through different communication pathways such as by the user accessing a web site of the service provider.

When the pickup pause feature is enabled and placed in a first mode, the service provider would playback a message to the caller indicating that the recipient is unavailable to answer the call prior to or concurrent with notification of the recipient of the call. When the pickup pause feature is enabled and placed in a second mode, the user could answer the wireless communication unit normally, but immediately push one or more selected keys (perhaps with the SEND key) to output values (e.g., digital code, analog waveform, etc.) as content for a control signal to the service provider to trigger the playback of a message. While the service provider would continue to receive audio information from the recipient's wireless communication unit, this audio signal would not be passed through to the caller until the recipient had indicated his desire to complete the connection as described above (again, perhaps with a second push of the PAUSE button, "#" button or some other button). This allows the recipient to extricate himself or herself from a potentially sensitive location without concern that the audio from such environment be inadvertently received by the caller.

IV. Other Enhancements

Referring now to Figure 6, an illustrative flowchart describing a first enhancement of the pickup pause feature is shown. In response to receiving an incoming call, either automatically or at the recipient's express selection, the incoming call is answered with a recorded message indicating a delay in answering the call along with a confirmation request (blocks 600 and 610). The confirmation request requires the caller to indicate whether he or she would be willing to wait for the recipient to complete the connection. For example, the recorded message might state the following:

> "The intended recipient cannot immediately pickup this call, but will do so in approximately thirty (30) seconds – do you wish to wait? If so, please press the # key."

In this case, the recipient could see right away through a signal received by his wireless communication unit whether the caller was willing to wait for the stated duration (blocks 630 and 640). If no response is provided by the caller, the incoming call is transferred to voicemail, which allows the caller to leave a verbal message.

Referring now to Figure 7, an illustrative flowchart describing a second enhancement of the pickup pause feature is shown. In response to receiving an incoming call, the recipient may be able to select any of a plurality of recorded message options (blocks 700 and 710). Such selection may occur at the time of the incoming call. For example, as shown in block 720, the recipient might select a first message type that indicates a shorter time delay (e.g., thirty seconds) for a small meeting with co-workers (where its quick and easy to duck out). Alternatively, as shown in block 730, the recipient may select a second message type that indicates a longer time delay (one minute or longer) for a client meeting or public gathering such as a symphony (where picking up would undoubtedly take much longer).

Referring now to Figure 8, an illustrative flowchart describing a third enhancement of the pickup pause feature is shown. In a continuously changing environment, the recipient may realize that he or she would not be able to answer the incoming call within the prescribed time delay (block 800). If so, the recipient can depress a particular trigger button (e.g. the "*" key) to explicitly cause an alternative message to be played to the caller (block 810). As an alternative or complementary enhancement, upon depressing the particular trigger button, the user may now program the duration of delay by subsequently depressing a numerical button (0-9) or a combination of numerical buttons (00-99) to indicate minutes or seconds of additional delay as shown in block 820.

A fourth enhancement allows the user to program an amount of time (or select a preprogrammed amount of time) during which the pickup pausing feature (whether provided by the wireless communication unit or a service provider) will be active. For example, upon entering a one-hour meeting, the user could select "pickup pausing" and the time duration "1 hour" so that the pickup pausing function would be active for the duration of the meeting. Such duration may be controlled by timer 380 of Figure 3. At the end of the one-hour period, the pickup pausing feature is automatically disengaged (by the phone or service provider), thereby relieving the user of the burden of remembering to disengage the feature.

In one instance, the "pickup pause" feature may be provided by software loaded into internal memory of the wireless communication unit and executed by the processing unit. The user activates the pickup pause feature by accessing a scroll-down menu and

selecting this feature. Thereafter, a secondary menu is displayed on the display to allow the user to either select the amount of pause time or enter the amount of time via the keypad.

In another instance, the pickup pause feature may be provided by contacting the service provider through a telephone call or an alphanumeric message from the wireless communication unit.

Those skilled in the art will recognize that the wireless communication unit and method of the invention have many applications, and that the invention is not limited to the representative examples disclosed herein. Moreover, the scope of the present invention covers conventionally known variations and modifications to the system components described herein, as would be known by those skilled in the art.